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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/601,234	10/30/2000	Kenichi Morigaki	MAT-799US	8757

7590

06/16/2004

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 06/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/601,234

Applicant(s)

MORIGAKI ET AL.

Examiner

Susy N Tsang-Foster

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The terminal disclaimer filed on 3/5/2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent No.

6,090,505 has been reviewed and is accepted. The terminal disclaimer has been recorded.

2. This Office Action is responsive to the amendment filed on 4/5/2004. Claims 1, 8, 14, 15, and 17-20 have been amended and claims 23-30 have been added. Previous art rejections based on JP 10-092424 A have been withdrawn in view of applicant's arguments and after further consideration by the Examiner. The terminal disclaimer filed on 3/5/2004 overcomes obviousness type double patenting rejections based on U.S. Patent No. 6,090,505. However, applicant did not file a terminal disclaimer for obviousness type double patenting rejections based on U.S. Patent No. 6,605,386. Claims 1-30 are pending and are rejected for reasons given below. This Office Action is made non-final as new grounds of rejection are made that are not necessitated by applicant's amendment.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 3, 10-14, 16, 23-25, and 30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Kawakami et al. (US 5,824,434).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 disclose all the limitations of claims 1, 3, 10-14, 16, 23-25, and 30 except a polymer gel electrolyte in the nonaqueous secondary battery and that the polymer gel electrolyte comprises polyethylene oxide.

Kawakami et al. teach that a polymer gel electrolyte is used in a nonaqueous electrolyte secondary battery because the use of a polymer gel electrolyte prevents leakage of liquid electrolyte from the battery and that a suitable polymer gel electrolyte comprises polyethylene oxide (see abstract and col. 20, lines 44-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polymer gel electrolyte comprising polyethylene oxide in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,605,386 B1 because a polymer gel electrolyte comprising polyethylene oxide prevents leakage of liquid electrolyte from the battery.

5. Claims 8, 9, 14, 21, and 22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Iwamoto et al. (USP 5,589,296).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 disclose all the limitations of claims 8, 9, 14, 21, and 22 except using a lithium ion conductive glass solid electrolyte instead of a separator and that the glass solid electrolyte is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon sulfide, a phosphor sulfide, and a boron sulfide, and a third component including at least one of lithium phosphate, lithium sulfate, lithium borate, and lithium silicate.

Iwamoto et al. teaches a solid electrolyte for a nonaqueous electrolyte secondary battery (col. 1, lines 15-20; col. 2, lines 24-27; col. 13, lines 2-5) that is a lithium ion conductive glass solid electrolyte and that the glass solid electrolyte is synthesized with row materials including (see col. 2, lines 51-60) a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) to give a solid electrolyte having a distinguished ion conductivity (col. 2, lines 5-11) and prevent leakage problems due to using liquid electrolytes (col. 1, lines 24-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lithium ion conductive glass solid electrolyte of Iwamoto et al. that is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,605,386 B1 because the glass solid electrolyte has a distinguished ion conductivity and prevents leakage problems due to using liquid electrolytes as taught by Iwamoto et al. (col. 1, lines 24-30).

6. Claims 1, 2, 4, 10, 15-17, 23, and 26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of EP 730316 A1.

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 all the limitations of claims 1, 2, 4, 10, 15-17, 23, and 26 except that the positive electrode includes a polymer gel electrolyte and the negative electrode includes a polymer gel electrolyte and that the polymer is a polymer of vinylidene fluoride.

EP 730316 A1 teaches polyvinylidene (PVDF) homopolymer or polyvinylidene fluoride (PVDF) copolymer as the solid electrolyte material for a separator and for the positive and negative electrodes of a nonaqueous electrolyte secondary battery with electrolyte material being present in the separator and in the electrodes (see page 13, lines 35-50) because the PVDF provides for a porous structure in the separator and in the electrodes that would increase the

utilization of the active material and electrolyte material (see page 5, lines 24-29) due to enhanced electrolyte mobility from the porous structure. The PVDF copolymer can be copolymers of vinylidene fluoride and hexafluoropropylene (see page 4, lines 30-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte as the polymer gel electrolyte in the battery of U.S. Patent No. 6,605,386 B1 because the PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte are stable and compatible in a nonaqueous secondary battery environment and are conventionally used in the art. The use of these polymer gel electrolytes in the separator and in the electrodes also gives increased efficiency in the battery due to the porous structure of the polymer as taught by EP 730316 A1.

Furthermore, it would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the polymer gel electrolyte in the electrodes of a nonaqueous electrolyte secondary battery because the use of the same polymer matrix in the electrode and in the separator (solid electrolyte) ensures chemical compatibility of the polymer as a binder for the electrodes with the polymer electrolyte.

7. Claims 6, 7, 19, 20, 23, 28, and 29 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Kawakami et al. (US 5,824,434) as applied to claims 1 and 14 above, and further in view of Gies et al. (USP 5,665,265).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in combination with Kawakami et al. (US 5824434) teach all the limitations of claims 6, 7, 19, 20, 23, 28, and 29

except that the polymer gel electrolyte includes a non-woven fabric of a polyolefin polymers, and that the polymer is a copolymer of methacrylate and an ethylene oxide.

Gies et al. teaches a polymer gel electrolyte that includes a non-woven fabric of polyolefin polymers (col. 3, lines 18-60) and that the polymer gel electrolyte can be polyethylene oxide, polymethylmethacrylate and copolymers thereof.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a polymer gel electrolyte include a non-woven fabric of polyolefin polymers for good mechanical integrity of the electrolyte as taught by Gies et al. (see col. 2, lines 15-20).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use a copolymer of methacrylate and an ethylene oxide as the polymer gel electrolyte in a nonaqueous electrolyte secondary battery because the copolymer is capable of absorbing electrolyte species to form a gel polymer electrolyte and it is functionally equivalent to the polyethylene oxide used in the gel polymer electrolyte of the Kawakami et al. as taught by Gies et al. (col. 3, lines 44-58).

8. Claims 5, 18, 23, and 27 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Kawakami et al. (US 5,824,434) as applied to claims 1 and 14 above, and further in view of St. Aubyn Hubbard et al. (USP 5,460,903).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in combination with Kawakami et al. (US 5824434) teach all the limitations of claims 5, 18, 23, and 27 except that the polymer in the polymer gel electrolyte is a polyester polymer.

St. Aubyn Hubbard et al. teaches a polymer gel electrolyte comprising polyester polymer for a nonaqueous electrolyte secondary battery (see abstract; col.2, lines 33-45; col. 3, lines 1-15, lines 35-41 and lines 65-67) because polymer gel electrolytes containing polyester as the polymer provides for mechanical rigidity.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyester as the polymer in the polymer gel electrolyte in the battery of U.S. Patent No. 6,605,386 B1 because polymer gel electrolyte comprising polyester has improved mechanical stability.

Conclusion

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ *Susy Tsang Foster*

Susy Tsang-Foster
Primary Examiner
Art Unit 1745